IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Torborg et al. Group Art Unit: 1712

Serial #: 09/724,493 Examiner: Margaret G. Moore

Filed: November 28, 2000 Attorney Docket No.: EE-083-US-01

Title: Low Gloss Powder Coating Compositions

MS: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.131

Charles Torborg and Jeffrey Schmierer declare:

1. that they are the applicants of the above-identified application

2. The invention claimed in the above-identified application was jointly conceived and reduced to practice in the United States of America prior to August 21, 2000, as indicated by the following facts, supported by the attached Exhibit 1.

3. All of the work described in Exhibit 1 was performed at H.B. Fuller Company, St. Paul, Minnesota, U.S.A., prior to August 21, 2000.

4. Exhibit 1 is a copy of H.B. Fuller Confidential Invention Disclosure entitled "Reduced Gloss Low Cure Acrylic Powder Coating", which contains a record of some of the early work on the low gloss coating by Charles Torborg, one of the declarants herein. The dates recorded on these documents have been blocked and are considered confidential at this point in time.

5. The Invention Disclosure describes the low gloss powder coating composition that includes two components dry blended together prior to the application. The first

component (a) includes (i) at least one glycidyl group-containing acrylic resin having epoxide equivalent weight of from about 250 to about 1500 and glass transition temperature of from about 30° C to about 80° C; and (ii) a curing agent chosen from dicarboxylic acids, dicarboxylic acid anhydrides and mixtures thereof. The second component (b) includes at least one carboxyl-group containing material that has an acid number of from about 10 to about 300 and that is not substantially compatible with the first component.

6. that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that statements are made with the knowledge that willful and false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 1/27/05 Charles Torborg

Date: 02/03/05 Jeffrey Schmierer

Exhibit 1

FORM A

H.B. FULLER COMPANY
CONFIDENTIAL INVENTION DISCLOSURE

Disclosure #: (Patent Dept will fill in) 99-083	Page 1 of 28
Originating Unit: Specialty Group - Global Coatings Division	
Title: Reduced Gloss Low Cure Acrylic Powder Coating	
Technology Area: ☐ Waterbase ☐ Hot Melt x Thermoset/Other	
Other Interested Departments / Business Units: Woodworking	

Include: *(Use attached pages for the following descriptions - inventor sign each page)*

1) Short description of the invention.
2) Describe the utility of the invention, including the difference(s) and advantage(s) over previous approaches.
3) Provide examples which illustrate the invention by attachment of notebook pages.
4) Identify all people (inventors) who have contributed to this invention.
5) List and attach any other relevant information such as patent and literature searches, internal reports, drawings, etc.
6) Is this invention potentially a trade secret?

Send:
- Original Form A to Patent Department
- Copy of Form A and Form B to Dept Head

Described by: (Print or type name)	Read & Understood by: (Print or type name of witness)
CHARLES TORBORG	Christine Griese
Signature: Charles Torborg	Signature: Christine Griese
Date	

INVENTION DISCLOSURE DESCRIPTION

1) In the present invention catalyzed polyester particles are dry blended with a low cure glycidyl methacrylate (GMA) powder coating. The resulting powder mixture yields a cured film with excellent smoothness and a 60° gloss as low as 20. The gloss can be controlled by the amount of polyester used.

2) Epoxy functional acrylic powder coatings have been known for their outstanding smoothness and weathering resistance. Mitsui Chemicals, Inc describes in EP 0849340A2 an acrylic powder composition that includes tin catalysts and can be cured from 120 to 160 °C for 10 to 60 minutes. The cured coatings are high gloss (60° gloss = 60 to 100). Traditionally it has been difficult to lower the gloss of these coatings without sacrificing considerable smoothness. The advantage of this invention is that it offers a low cure acrylic coating in which the gloss can be adjusted without a significant impact on smoothness and physical properties.

The described invention is very well suited as a coating for heat sensitive substrates such as wood, wood composites and plastics.

3) See pages 5 - 8, 10 - 13 and 28 of notebook # 6851 attached.
4) Inventor: Chuck Torborg
5) EP 0849340 A2
6) This invention is a potential trade secret.

Described by: (Print or type name)	Read & Understood by: (Print or type name of witness)
CHARLES TORBORG	Christine Griese
Signature: Charles Torborg	Signature: Christine Griese
Date	Da

H.B. Fuller Company

RESEARCH NOTEBOOK
CONFIDENTIAL

BOOK: C

PAGE 5

TITLE OF EXPERIMENT: Lower gloss Acrylic

DATE:

LABORATORY LOCATION:

PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	5A	5B	5C	5D	5E
PD-3402	69.5	68.75	70.75	68.75	75.5
ADDITOL UVL 1381	30.5	31.25	29.25	31.25	24.5
PGT HBF	1.5	1.5	1.5	1.5	1.5
URAFlow B	0.5	0.5	0.5	0.5	0.5
OCTAFlow ST-70	2.0	2.0	2.0	2.0	2.0
CAB-OSIL TS-720	—	2.0	—	5.0	—

STOICED FOR 100pts $700/631 90/10

STOICED FOR 10pts $700/631 90/10 per hund

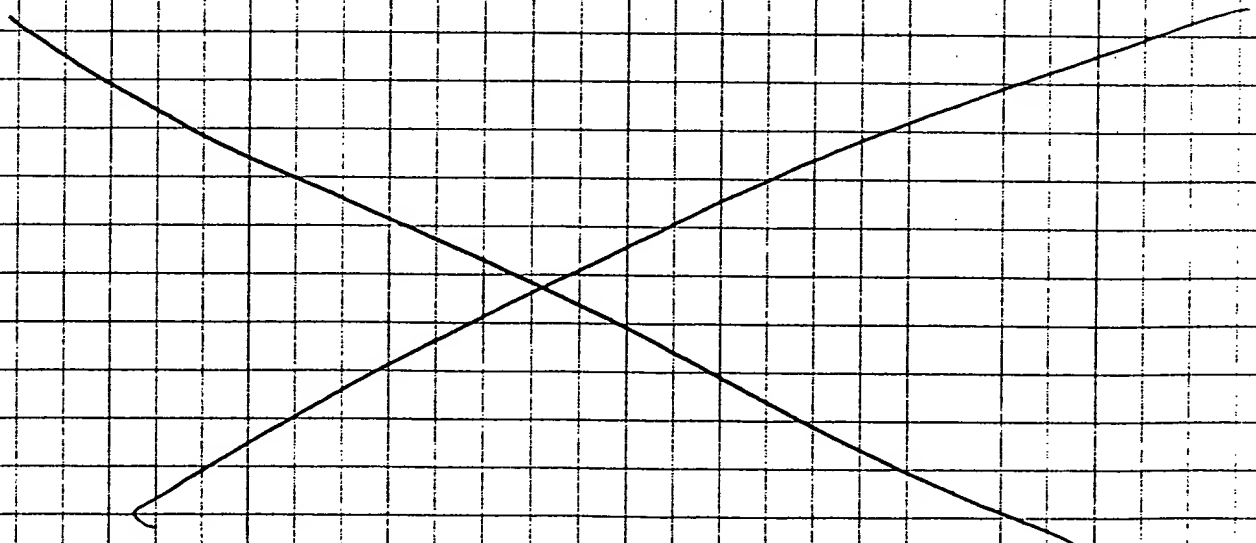
STOICED FOR 30pts $700/631 90/10 per hun

CAB-O-SIL TS-720 -

6851-5B: 79.6gloss at 5mils

6851-5D: 65 gloss at 5mils - heavy orange peel

Cabosil does little to lower the gloss but increases orange peel dramatically.



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BOOK 6851

PAGE 6

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TITLE OF EXPERIMENT: Catalyzed polyester for acrylic dryblend. DATE:

LABORATORY LOCATION: PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	6A
PS700	90
B31	10

The following mixtures were dryblend together, coated on a 3/4" MDF panel preheated at 325°F for 10 minutes and cured at 325°F for 10 minutes:

Mixture		60° gloss at 5 mils	50 MEK double rubs
80% 6851-5A / 20% 6851-6A	"OVERSTROKED"	52.8	no rub off
70% 6851-5C / 30% 6851-6A	"OVERSTOICHED"	43.4	no rub off
6851-4A (for comparison		81.1	
100pts 6851-5A / 10pts 6851-6A		69.6	no rub off
100pts 6851-5C / 30pts 6851-6A		46.6	no rub off
100pts 6851-5C / 27pts PS700		45.7	moderate rub off - tacky
100pts 6851-4A / 3pts B-31		71.2	no rub off
100pts 6851-5E / 100pts 6851-6A		29.6	moderate rub off

The above data indicate that it is the polyester that lowers the gloss but the B-31 improves MEK resistance.
Alagany was the manufacturer of the MDF

CHEMIST: Charles Tortorig

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DATE: Christina [signature]

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BOOK 6[illegible]

PAGE 7

TITLE OF EXPERIMENT: White reduced gloss acrylic dryblend

DATE:

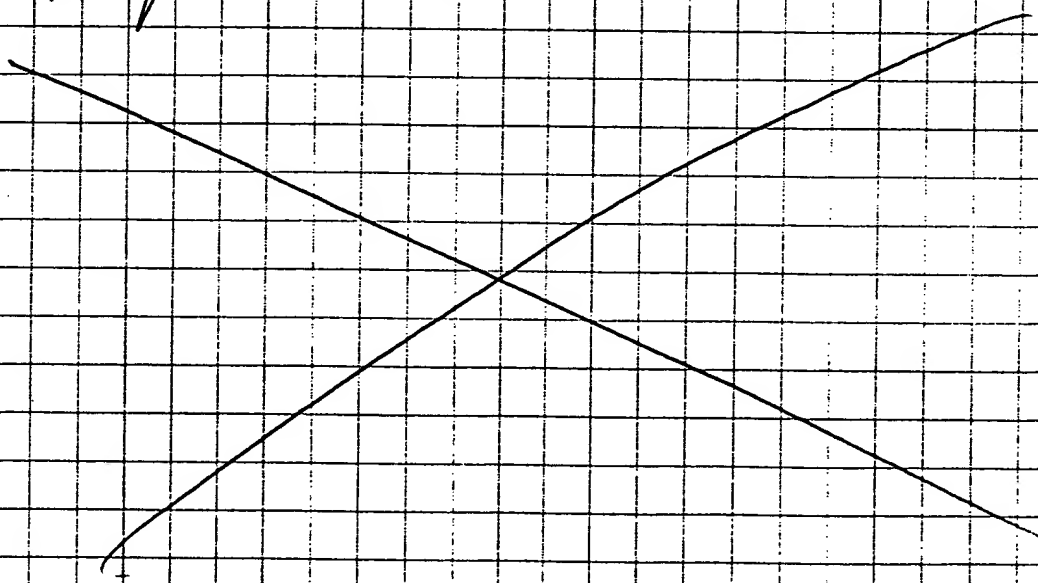
LABORATORY LOCATION:

PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	7A	7B
PD-3902	70.75	—
ADDITOL VXL 1381	29.25	—
RESIFLOW P67 HBF	1.5	—
URAFLOW B	0.5	—
OCTAFLOW ST-70	2.0	—
RCL-2	25	25
URALAC P5700	—	90
B-31	—	10

100 pts of 6851-7A were dryblended with 30 pts 6851-7B. The blend was coated on a 3/4" preheated (10 min/325°F) MDF panel and cured for 1 minute at 325°F. The resulting coating had moderate orange peel and at 60° gloss of 49 at 5 mils.



CHEMIST: Charles Tomkowicz DATE:

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PAGE 8

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RESEARCH NOTEBOOK
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TITLE OF EXPERIMENT: Low-gloss clear — DATE:

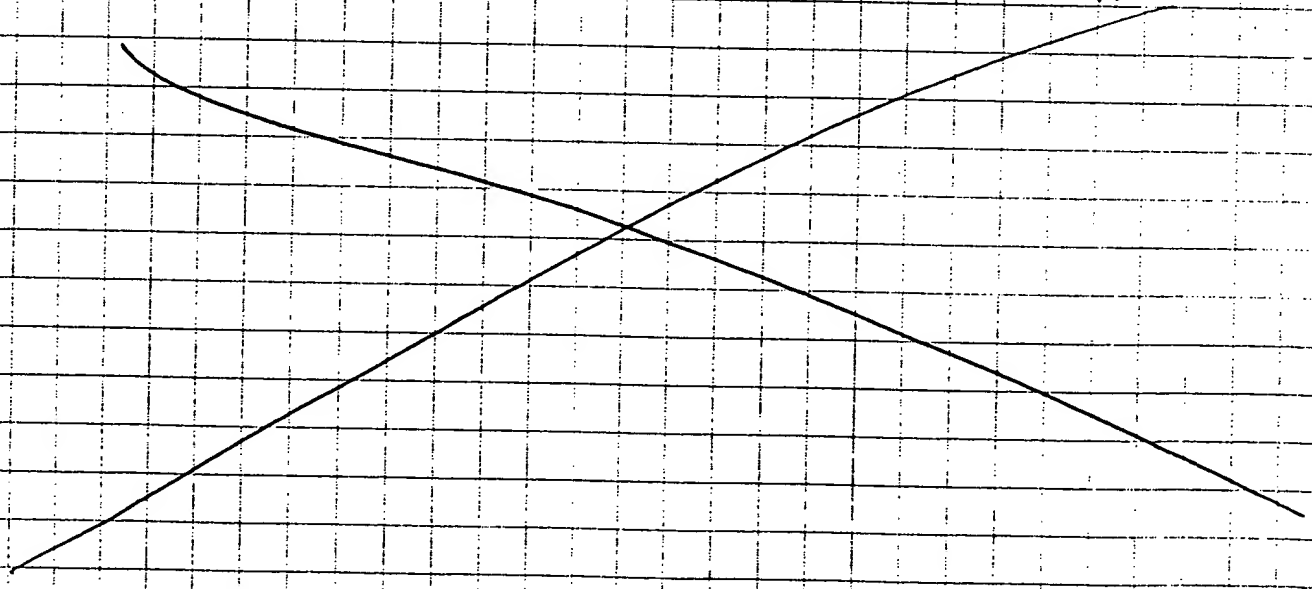
LABORATORY LOCATION: — PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	8A	8B	8C
PD-3402	72.25	73.75	71.75
Additol VXL 1381	27.75	26.25	28.25
967-HBE	1.5	1.5	1.5
VRAFLOW B	0.5	0.5	0.5
OCTAFLOW ST-70	2.0	2.0	2.0

The following dryblends were coated on prepainted (10mm, 325°F) 3/4" MDF supplied by Valamate. The coatings were cured at 325°F for 10 minutes.

	60° gloss at 5 mils	50 MEK double rubs
100 pts 6851-8A / 50 pts 6851-6A	28.2	moderate rub off
100 pts 6851-8B / 75 pts 6851-6A	24.6	moderate rub off
100 pts 6851-8C / 40 pts 6851-6A	47.3	slight Rub off



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TITLE OF EXPERIMENT: *Catalyst Level in Polyester/Acrylic Dryblend* DATE:

LABORATORY LOCATION: PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	10 A	10 B	10 C
RALAC PS700	95	90	80
B-31	5	10	20

6851-SC was formulated for 27 parts PS700 per hundred parts of GMA/A001 resin

100/104.2 = 0.9597 0.9597 x 27 = 25.9

Need 25.9 pts PS700 per 100 pts 6851-SC

10A = 95% PS700	25.9/0.95 = 27.28	27.28 pts	10A / 100 pts SC
10B = 90% PS700	25.9/0.90 = 28.8	28.8 pts	10B/100 pts SC
10C = 80% PS700	25.9/0.80 = 32.4	32.4 pts	10C/100 pts SC

	60° gloss at 5 mils	50 MEK double rubs
10A/SC	46.3	moderate rub off
10B/SC	44.8	very slight rub off
10C/SC	41.6	moderate rub off

CHEMIST: *Charles Tortorz* DATE:

Christine Gibson

H.B. Fuller Company

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BOOK 6

PAGE 11

TITLE OF EXPERIMENT: Evaluation of Several Polyesters in the Acrylic

DATE:

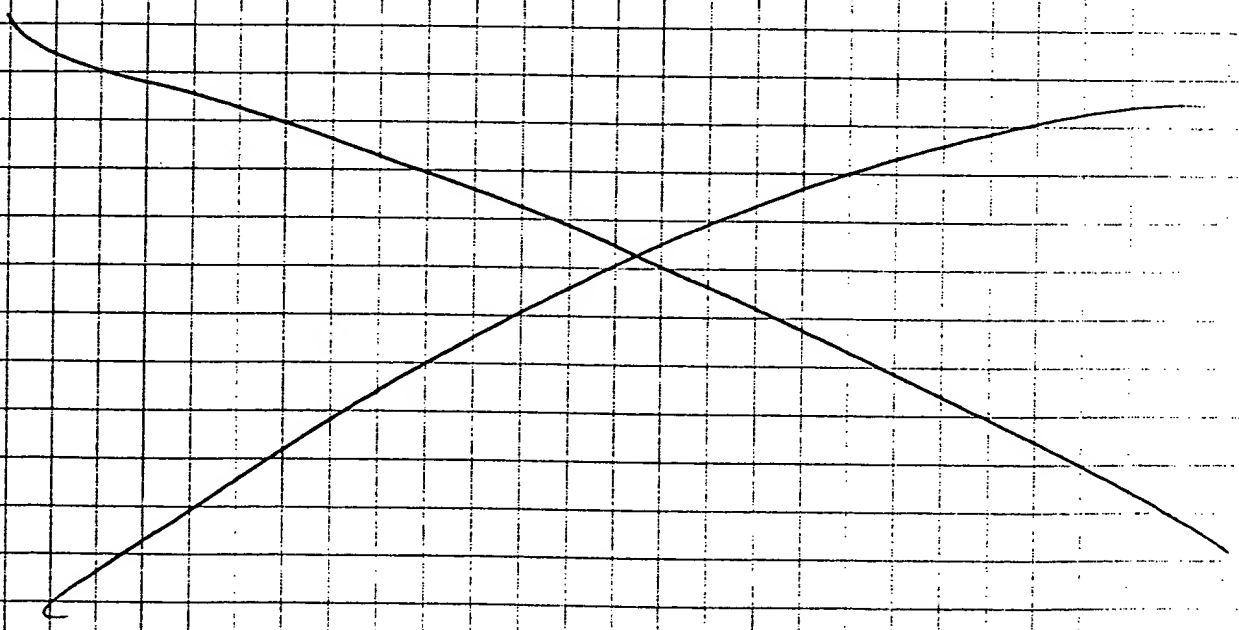
LABORATORY LOCATION:

PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

The following resins were individually ground and sifted through a 100 mesh screen. Each resin was dry blended with 6851-SC in a ratio of 100 pts 6851-SC to 25 pts polyester resin. The mixtures were coated on pretreated 3/4" MDF (10 min/325°F) and cured at 325°F for 10 min.

	60° Gloss @ 5 mils
Uralac P-3700 (TGIC - LOW CURE)	37.2
Cycloat 440 (TGIC)	40.9
Cycloat 340 (HYBRID)	22.8
Cycloat 630 (TGIC - SUPER DURABLE - HIGH FLOW)	38.7
Cycloat 2988 (HYBRID - SUPER DURABLE)	48.3
Finerite 7206 (HYBRID - LOW CURE)	28.6



CHEMIST: Charles Tarbory

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TITLE OF EXPERIMENT: DATE:

LABORATORY LOCATION: PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	12A	12B	12C
CRYLCOAT 340	90	—	—
B-31	10	—	—
PD-3402	~~70~~ 65	70	72.7%
Additol VXL 1381	30	30	27.3%
PG7-HBE	1.5	1.5	1.5
VRAFLOW B	0.5	0.5	0.5
OCTAFLOW ST-70	2.0	2.0	2.0

dry blends

100pts 6851-12B
10pts 6851-12A } glow at 5 mils: 54.4 — 50 MEK DR slight rub off

100pts 6851-12C
30pts 6851-12A } 52.3 — moderate rub off

100pts 6851-12C
27pts Crylcoat 340 } 36 — slight rub off

The above results are surprising. It looks like the catalyst B-31 causes the gloss to increase

CHEMIST: Charles Tarbox

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Charles Tarbox

H.B. Fuller Company

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BOOK 6

PAGE 13

TITLE OF EXPERIMENT: DATE:

LABORATORY LOCATION: PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

6851	13A (5% STOIC)	13B (100% STOIC)	13C (200% STOIC)	13D STOICHED FOR 20pts CRYLcoat 340
CRYLcoat 340	95.5	91.5	84.5	—
B-31	4.5	8.5	15.5	—
PD-3402				72
ADDITOL VXL 1381				28.5
PG7 HBF				~~2.5~~ 1.0 CT
VRAFLOW B				CT ~~2~~ 0.5
ST-70				2.0

The following dryblends were coated on preheated (10min, 325°F) MDF and cured at 325°F for 10 minutes.

	60° Gloss @ 5mils	30 MEK Double Rubs
20pts 6851-13A } 100pts " 13D }	36.2	mod. rub-off
20pts 6851-13B } 100pts 6851-13D }	42.8	CT mod-heavy slight rub-off
20pts 6851-13C } 100pts 6851-13D }	55.2	slight to moderate rub-off
20pts CRYLcoat 340 } 100pts 6851-13D }	32.3	

CHEMIST: [signature] DATE:

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TITLE OF EXPERIMENT:

DATE:

LABORATORY LOCATION:

PROJECT NO.:

OBJECTIVE OF EXPERIMENT:

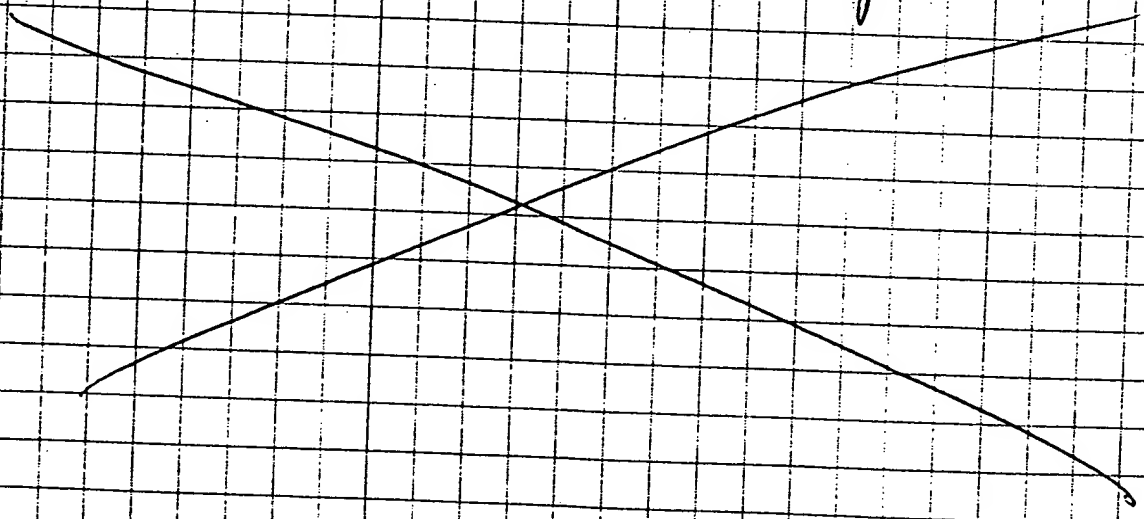
6851	28A	28B
Cerucoat 340	95.0	—
ST-70	5.0	5.0
P5700		95.0

Samples were dryblended using 100 pts of 6851-27A and 20 parts of one of the samples above

	60° gloss	50 MEK Double Rubs
28A/27A	15.1	Moderate ruboff
28B/27A	30.4	slight → moderate ruboff
13B/27A	42.5	" " "

13B = 6851-13B → 91.5 pts P-5700, 8.5 pts B-31

As sample of 100 pts 6851-27B, 20 pts 6851-28B and 2 pts Aerosil 200 were bagblended, and coated on MDF to yield a smooth metallic with a 41 gloss



CHEMIST: Charles Tarbox

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Austin Hess